

SEP 07 2001

TECH CENTER 1600 2900

1631

## RAW SEQUENCE LISTING

DATE: 08/08/2001

PATENT APPLICATION: US/09/492,709A

TIME: 14:56:17

Input Set : D:\001asubst.txt

Output Set: N:\CRF3\08082001\I492709A.raw

ENTERED

4 <110> APPLICANT: Zyskind, Judith  
5 Ohlsen, Kari L.  
6 Trawick, John  
7 Forsyth, R. Allyn  
8 Froelich, Jamie M.  
9 Carr, Grant J.  
10 Yamamoto, Robert T.  
11 Xu, H. Howard  
14 <120> TITLE OF INVENTION: GENES IDENTIFIED AS REQUIRED FOR PROLIFERATION IN  
15 ESCHERICHIA COLI  
17 <130> FILE REFERENCE: ELITRA.001A  
C--> 19 <140> CURRENT APPLICATION NUMBER: US/09/492,709A  
C--> 19 <141> CURRENT FILING DATE: 2000-01-27  
19 <160> NUMBER OF SEQ ID NOS: 485  
21 <170> SOFTWARE: FastSEQ for Windows Version 3.0  
23 <210> SEQ ID NO: 1  
24 <211> LENGTH: 159  
25 <212> TYPE: DNA  
26 <213> ORGANISM: E. Coli  
28 <400> SEQUENCE: 1  
29 cagtggttat ggaaacccaa aatggagacg ggaagctgaa ccagatagtt actggaggtg 60  
30 atcaccagca gatgaaataa cgataaccag aacaacgcct tatagcgttg agtttgcgag 120  
31 aaaacgttca tattgtacct ttttgattaa ccattgggg 159  
33 <210> SEQ ID NO: 2  
34 <211> LENGTH: 696  
35 <212> TYPE: DNA  
36 <213> ORGANISM: E. Coli  
38 <220> FEATURE:  
39 <221> NAME/KEY: misc\_feature  
40 <222> LOCATION: (1)...(696)  
41 <223> OTHER INFORMATION: n = A,T,C or G  
43 <400> SEQUENCE: 2  
44 gattacatca agcgcgcggt ggggtttaccg ggcgataaag tcacttacga tccggtctca 60  
45 aaagagctga cgattcaacc gggatgcagt tccggccagg cgtgtgaaaa cgcgctgccg 120  
46 gtcacctact caaacgtgga accgagcgat ttggttcaga ccttctcagc ccgtaatggt 180  
47 ggggaagcga ccagcggatt ctttgaagtg ccgaaaaacg aaaccaaaga aaatggaatt 240  
48 cgtctttccg agcgtaaaga gacactgggt gatgtgacgc accgcattct gacagtgccg 300  
49 attgcgcagg atcaggtggg gatgtattac cagcagccag ggcaacaact ggcaacctgg 360  
50 attgttcttc cgggacaata cttcatgatg ggcgacaacc gcgacaacag cgcggacagc 420  
W--> 51 cgttactggg gctttgtgcc ngaagcgaat ctggctcggtc nggcaacggc tatctggatg 480  
W--> 52 aacttcgata accaagaagg cgaatggccg aatggctctgc cctaantcgc attggcgntt 540  
W--> 53 cnttaatan ccacttcctt cnccttgtcc ccttatggca acacttaatt tattntaaan 600  
W--> 54 taatnccccg tggctnacaa atccccgcct tttnttaaaa atttccccna anttaagggt 660  
W--> 55 ggcctccagt tgccccnccc aaacactttg gncccc 696  
57 <210> SEQ ID NO: 3  
58 <211> LENGTH: 681  
59 <212> TYPE: DNA

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60 <213> ORGANISM: E. Coli
62 <220> FEATURE:
63 <221> NAME/KEY: misc_feature
64 <222> LOCATION: (1)...(681)
65 <223> OTHER INFORMATION: n = A,T,C or G
67 <400> SEQUENCE: 3
68 ctgcagggtta atgtcgccat taaactggcg caggcagcca aagagttgct ccgcttctac      60
69 ccagtcggca gcgacaactt gcgttaaagt cgcaaaatta tcactctgcac tcaactgcgtg      120
70 acgtaagcgg atggagtggc cggaaacctc atagtgcacg cccaccagtt ggcctgcac      180
71 gctttgtagc gtacgcgcgg cattggcaat aagattcaga tactcagact cttccggggc      240
72 cttcgccagc ataaaagagg aggatgctcg cgtatgcagc aactgctcca gcgcaaattg      300
73 cagccgcggg tgagtatcac tgaataaagg atcgttttcg tcaatcaaat gtggctgagc      360
74 aaatatttcc tgatagctat cggtatcagg aaccagggtc cgccatgcaa gtttcgtaat      420
W--> 75 ggtcaaagtt gatgtttttt agtctgttgt caaagccgcn attataccng taaccggcac      480
76 tacagcacac gttagaaagca cccgacaata ctcttgccat gggcggttaa gctcacagga      540
W--> 77 tggagatctt ttcttcaactg gcctaaaaag ctgatattct gtaaagagtt acacngtaac      600
W--> 78 attgagatcg ctatgaaata tcaacaactt ggaaaatcct gnaaagcngg ttggaaaatg      660
79 gaaagtatct ggttaagaag c                                     681
81 <210> SEQ ID NO: 4
82 <211> LENGTH: 289
83 <212> TYPE: DNA
84 <213> ORGANISM: E. Coli
86 <400> SEQUENCE: 4
87 ggcagaatth tacgtgacc aatgacgcga cgacgtggca tggaaatact ccgttggttaa      60
88 ttcaggattg tccaaaactc tacgagttta gtttgacatt taagttaaaa cgtttggcct      120
89 tacttaacgg agaaccatta agccttagga cgcttcacgc catacttgga acgagcctgc      180
90 ttacggtctt taacgcgcga gcagtcacgc gcaccacgta cgggtgtgga acgaacaccc      240
91 gggaggtctt taacacgacc gtcacggatc aggatcacgg agtgctcct      289
93 <210> SEQ ID NO: 5
94 <211> LENGTH: 815
95 <212> TYPE: DNA
96 <213> ORGANISM: E. Coli
98 <220> FEATURE:
99 <221> NAME/KEY: misc_feature
100 <222> LOCATION: (1)...(815)
101 <223> OTHER INFORMATION: n = A,T,C or G
103 <400> SEQUENCE: 5
104 gggagcttac atcagtaagt gaccgggatg agcagagcga gataacgcat ctgcggcgcg      60
105 aaatatgaag ggggagagcc cttatagacc aggtagtaca cgtttggtta gggggcctgc      120
106 atatggcccc ctttttcaact ttatatctg tgcgggttaa tgccgggcag atcacatctc      180
107 cgaggatttt agaattggctg aaattaccgc atccctggta aaagagctgc gtgagcgtac      240
108 tggcgaggc atgatggatt gcaaaaaagc actgactgaa gctaacggcg acatcgagct      300
109 ggcaatcgaa aacatgcgta agtcgggtgc tattaaagca gcgaaaaaag caggcaacgt      360
110 tgctgctgac ggcgtgatca aaacccaaat cgacggcaac tacggcatca ttctggaagt      420
111 taactgccag actgacttcg ttgcaaaaga cgctggtttc caggcggttcg cagacaaagt      480
112 tctggacgca gctgttgctg gcaaaatcac tgacgttgaa gttctgaaag cacagttcga      540
113 agaagaacgt gttgcgctgg tagcgaaaat tggtgaaaac atcaacattc gccgcgttgc      600
114 tgcgctggaa ggcgacgttc tgggttctta tcagcacggg gcgcgtatcg gccgttctgg      660
115 ttgctgctaa aagcgcgtgac gaagaactgg ttaaacacat cgttttgacc tttgttgcaa      720

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W--> 116  gccaaagccag aattcagaga aactttccgc ttcaccggag gtcccaccca cangganccc 780
W--> 117  cgattttntc agcatggtgg tcttcctnec gagtt 815
119 <210> SEQ ID NO: 6
120 <211> LENGTH: 403
121 <212> TYPE: DNA
122 <213> ORGANISM: E. Coli
124 <400> SEQUENCE: 6
125  caacactatt ttgttgaccg gaaaatggaa cactttccgc aatgcctgtt gctatcacgc 60
126  ttaaaccatt tcattgcgat ttacacagaa cggacgtcct gtcgcagtat attaatgcgt 120
127  cgatagaaac aagcattgaa aggacacaga gtagtcaaac agtgtgaaac gctactggcg 180
128  ccttacagcg caaaaaggct ggtgactaaa aagtcaccag ccacagcct gatttctcag 240
129  gctgcaaccg gaagggttgg cttatttaac ttcaacttca gcgccagctt cttccagagc 300
130  ttttttcagt gcttctgcgt cgtctttgct cagccttct ttcagagcag ccggtgcaga 360
131  ttctaccagg tctttagctt ctttcagacc caggccagtt gcg 403
133 <210> SEQ ID NO: 7
134 <211> LENGTH: 149
135 <212> TYPE: DNA
136 <213> ORGANISM: E. Coli
138 <400> SEQUENCE: 7
139  gagctttttt cagtgttctt gcgtcgtctt tgcctacgcc ttctttcaga gcagccggtg 60
140  cagattctac caggtcttta gcttctttca gaccagggcc agttgcgcca cgtactgctt 120
141  tgataacagc aactttgtta gcgccagca 149
143 <210> SEQ ID NO: 8
144 <211> LENGTH: 742
145 <212> TYPE: DNA
146 <213> ORGANISM: E. Coli
148 <220> FEATURE:
149 <221> NAME/KEY: misc_feature
150 <222> LOCATION: (1)...(742)
151 <223> OTHER INFORMATION: n = A,T,C or G
153 <400> SEQUENCE: 8
154  ccactctgcc attgagcgga cagtttgtgc aacactatth ttgttgaccgg aaaatggaac 60
155  actttccgca atgcctgttg ctatcacgct taaaccatth cattgcgatt tacacagaac 120
156  ggacgtcctg tcgcagtata ttaagtcgtc gatagaaaca agcattgaaa ggcacagcag 180
157  tagtcaaaca gtgtgaaacg ctactggcgc cttacagcgc aaaaaggctg gtgactaaaa 240
158  agtcaccagc catcagcctg atttctcagg ctgcaaccgg aagggttggc ttattttaact 300
159  tcaacttcag cgccagcttc ttccagagct tttttcagtg cttctgcgtc gtctttgtctc 360
160  acgccttctt tcagagcagc cgggtgcgat tctaccaggt ctttagcttc tttcagaccc 420
161  aggccagttg cgccacgtac tgctttgata acagcaactt tgttagcgcc agcagctttc 480
W--> 162  agaattacgt cgaattcagt tntttcttca gcagcttcaa ccgggccagc agctacagct 540
163  acagcagcag caagcggaaa caccgaatth ttcttccatt gcagagatca gttctacaac 600
164  cgtccattac agacatagct gcaactgctt caatgattth gatctttagt ggatagacat 660
W--> 165  ttaaaattgtt cctgaattat caagaaataa gtnttatacg taagccgaaa tgcgttaaaa 720
W--> 166  aagataactg ngattaaagc ag 742
168 <210> SEQ ID NO: 9
169 <211> LENGTH: 421
170 <212> TYPE: DNA
171 <213> ORGANISM: E. Coli
173 <400> SEQUENCE: 9

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174 agtagtcaaa cagtgtgaaa cgctactggc gccttacagc gcaaaaaggc tggtagactaa      60
175 aaagtcacca gccatcagcc tgattttctca ggctgcaacc ggaaggggtg gcttatttaa      120
176 cttcaacttc agcgccagct tcttccagag cttttttcag tgcttctgcg tcgtctttgc      180
177 tcacgccttc tttcagagca gccggtgcag attctaccag gtottttagct tctttcagac      240
178 ccaggccagt tgcgccacgt actgctttga taacagcaac tttgttagcg ccagcagctt      300
179 tcagaattac gtcgaattca gttttttctt cagcagcttc aaccgggcca gcagctacag      360
180 ctacagcagc agcagcgga acaccgaatt tttcttccat tgcagagatc agttctacaa      420
181 c                                                                                   421
183 <210> SEQ ID NO: 10
184 <211> LENGTH: 126
185 <212> TYPE: DNA
186 <213> ORGANISM: E. Coli
188 <400> SEQUENCE: 10
189 agagcttttt tcagtgttc tgcgtcgtct ttgctcacgc cttctttcag agcagccggt      60
190 gcagattcta ccaggctctt agcttctttc agaccaggc cagttgcgcc acgtactgct      120
191 ttgata                                                                                   126
193 <210> SEQ ID NO: 11
194 <211> LENGTH: 262
195 <212> TYPE: DNA
196 <213> ORGANISM: E. Coli
198 <220> FEATURE:
199 <221> NAME/KEY: misc_feature
200 <222> LOCATION: (1)...(262)
201 <223> OTHER INFORMATION: n = A,T,C or G
203 <400> SEQUENCE: 11
204 ctgcaaccgg aagggttggc ttatttaact tcaacttcag cgccagcttc ttccagagct      60
W--> 205 tttttcagtg cttctgcgtc gtctttgctc acgccttctt tcagagcagc cgttgcagat      120
206 tctaccaggt ctttagcttc tttcagaccc aggcaggttg cgccacgtac tgctttgata      180
207 acagcaactt tgtagcgcc agcagcttcc agaattacgt cgaattcagt tttttcttca      240
208 gcagcttcaa ccgggccagc ag                                                                                   262
210 <210> SEQ ID NO: 12
211 <211> LENGTH: 202
212 <212> TYPE: DNA
213 <213> ORGANISM: E. Coli
215 <220> FEATURE:
216 <221> NAME/KEY: misc_feature
217 <222> LOCATION: (1)...(202)
218 <223> OTHER INFORMATION: n = A,T,C or G
220 <400> SEQUENCE: 12
221 gcgcataccc tgcagcatcg gcccgatgga gatcaggctg gcagaacgct gtaccgcttt      60
W--> 222 gtaggtggtg ttaccggtgn tcagatccgg gaagatgaac acggtagcgc gacctgcaac      120
W--> 223 cggagagttc ggcgctttgg attncgcaac gtcagccatt accgcagcgt cgtactgcag      180
224 cggaccggcg atcatcaggt ca                                                                                   202
226 <210> SEQ ID NO: 13
227 <211> LENGTH: 261
228 <212> TYPE: DNA
229 <213> ORGANISM: E. Coli
231 <400> SEQUENCE: 13
232 tctaggagta agaatagctt caaattcagc agttgacagt ggcataaacg taactggtga      60

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```

233 cttttgcccgc gcatgacgcc gggctttttt tattattccg tgacttccag cgtagtgaag      120
234 gcaaacttct cgccatcaaa tagccctga ctggtagtt ttagcgcggt gatcactggc      180
235 agagaaagaa acgccatctg aataaacggc tcatcggtta acggaccgca ttcacgggcg      240
236 gggcttttca aggcgtcaat t                                     261
238 <210> SEQ ID NO: 14
239 <211> LENGTH: 224
240 <212> TYPE: DNA
241 <213> ORGANISM: E. Coli
243 <400> SEQUENCE: 14
244 ttcttttttt cgtcaacggt gtccagaatc attttattta cctcggggta cttatgctga      60
245 tttttattat tatggggaag gtgttattta tgagtttcat ttatgccgta acgacaatga      120
246 actcggggaat tagtataagc agcgcgagaa taataatcat tgtgcaaatg ctaatttaat      180
247 taatactatt taaatattat tttgagcata tgcacataag gttg                               224
249 <210> SEQ ID NO: 15
250 <211> LENGTH: 232
251 <212> TYPE: DNA
252 <213> ORGANISM: E. Coli
254 <400> SEQUENCE: 15
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256 tgctgatttt tattattatg gggaagggtg tttttatgag ttccatttat gccgtaacga      120
257 caatgaactc gggaattagt ataagcagcg cgagaataat aatcattgtg caaatgctaa      180
258 ttttaattaat actattttaa tattattttg agcatatgca cataagggtg gg                               232
260 <210> SEQ ID NO: 16
261 <211> LENGTH: 212
262 <212> TYPE: DNA
263 <213> ORGANISM: E. Coli
265 <400> SEQUENCE: 16
266 aatagcgggt atgcacgcct ttcttttttt cgtcaacggt gtccagaatc attttattta      60
267 cctcggttac ttatgctgat ttttattatt atggggaagg tgttatttat gagtttcatt      120
268 tatgccgtaa cgacaatgaa ctcggaatt agtataagca gcgcgagaat aataatcatt      180
269 gtgcaaatgc taatttaatt aatactattt aa                               212
271 <210> SEQ ID NO: 17
272 <211> LENGTH: 433
273 <212> TYPE: DNA
274 <213> ORGANISM: E. Coli
276 <400> SEQUENCE: 17
277 ccttgtaaat tatcgcccggt ggcataaaaa ctgcgtccaa acgcggtctt tgccagcagc      60
278 caggccataa atgccaccag aattatcgct aaccaacca ttgctgaaac gccagcagc      120
279 agcggggcgg agagctggtt cagttcggtg ggtaaccctt caatccattt gccgccagtc      180
280 cacagcaaca tgatgctctt gtacaacctt aacgtgccaa ggttggaac aatggcaggg      240
281 atcttttagcc acgcgaccag gacaccgttg aaaaatcccg cgagcaaac aagcagtaaa      300
282 gtcgcgacac aagcaacagg tagtgaatat cctgcgttca gtaacatccc caacagcacc      360
283 gcgcacattc cggtaatcga accactgaa acatcaatat tgcgcgtaag cattaccagc      420
284 gtcgcgcccc ttg                               433
286 <210> SEQ ID NO: 18
287 <211> LENGTH: 658
288 <212> TYPE: DNA
289 <213> ORGANISM: E. Coli
291 <400> SEQUENCE: 18

```

**Please Note:**

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

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L:19 M:270 C: Current Application Number differs, Replaced Current Application No  
L:19 M:271 C: Current Filing Date differs, Replaced Current Filing Date  
L:51 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2  
L:52 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2  
L:53 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2  
L:54 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2  
L:55 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2  
L:75 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3  
L:77 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3  
L:78 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3  
L:116 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5  
L:117 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5  
L:162 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8  
L:165 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8  
L:166 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8  
L:205 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11  
L:222 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12  
L:223 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12  
L:322 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19  
L:370 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:371 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:372 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:373 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:374 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:375 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22  
L:419 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:25  
L:420 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:25  
L:433 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:26  
L:482 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:28  
L:508 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:29  
L:559 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:32  
L:560 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:32  
L:593 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:34  
L:594 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:34  
L:669 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:39  
L:673 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:39  
L:712 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:713 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:714 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:715 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:716 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:717 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:718 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:719 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:720 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:721 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:722 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42  
L:723 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42

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L:752 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:44

L:773 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:45

L:774 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:45

L:775 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:45

L:12508 M:220 C: Keyword misspelled or invalid format, &lt;213&gt; ORGANISM for SEQ ID#:403

L:12519 M:220 C: Keyword misspelled or invalid format, &lt;213&gt; ORGANISM for SEQ ID#:404